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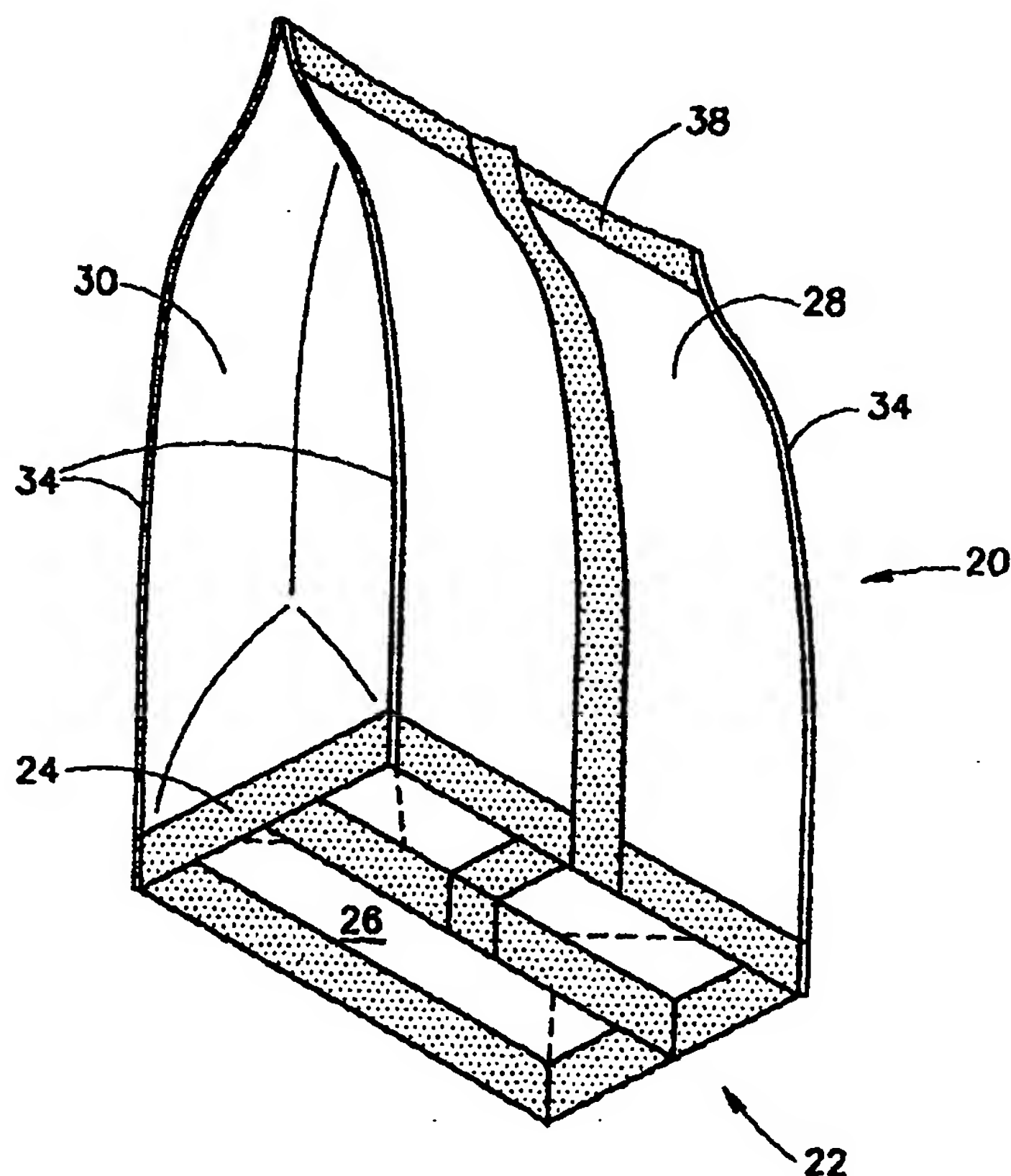
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(57) Abstract

A container and a process for its preparation, the container (20) having a base (26) and walls (28) extending upwards therefrom. The container is formed out of a single film of material in which at least an inner face is made of a heat weldable material and two side edges of the film sheet are welded to one another and overlapping portions of a bottom edge of the film sheet are welded to one another. The container comprises rigid skirt (24) portion extending at right angle below the base and is formed in a regular geometric shape. The container's base assumes a shape corresponding to the shape of the skirt portion and the shape of the skirt portion is fixed by welding overlapping portions of the wall to one another.



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CONTAINER HAVING STABILIZED BASE AND ITS MANUFACTURE

FIELD OF THE INVENTION

The present invention is in the field of flexible foil packages and in particular it is concerned with a container having a base with a stabilized structure, and a process for its manufacture. The term "*container*" as used
5 herein in the specification and claims refers to a container manufactured of a sheet of flexible film formed into a suitable shape useful as a packaging article.

BACKGROUND OF THE INVENTION

Containers with which the present invention is concerned are
10 extremely popular for food packaging, although not restricted thereto, as they provide superior flavor retention and longer shelf life than packages formed with other flexible materials. Flexible foil packaging is impervious to light, air, water and most other gases and liquids.

The major advantages of such containers are that they are easy to
15 manufacture, cheap and are usually suitable for holding a variety of goods. Such containers are light in weight, require minimal space in storage and are easily disposed of.

The most popular form of containers is the so-called "*pouch*" which is a bag or "*pillow*"-like sack formed out of a flexible packaging sheet of

material, e.g. paper, cardboard, plastic or a laminate formed into a shape of a bag or sack. A variety of processes for manufacturing such pouches are known and are referred to in the art as *vertical* or *horizontal form-fill-seal* processes. However, most pouches manufactured by any of these methods do
5 not comprise a noticeable base portion and those pouches which are formed with a base lack stability and rigidity of the base, and thus tend to deform upon filling.

Other pouches are known in which a base is integrally formed thereof. However, such pouches are not self-standing and they require the internal
10 pressure of their contents for stability. Furthermore, such pouches usually have an oval-shaped base and are thus less stable and so require more storage space. Still another drawback is that the structure of such products is not firm and thus they may collapse when they are not completely full.

In the present description and claims, the term "*heat weldable*
15 *material*" is used to determine layers of thermoplastic material, e.g., polyethylene, polypropylene, etc., which upon heating melt and may then be adhered to other such layers by a process which hereinafter in the specification will be referred to as "*welding*" or "*sealing*". The term "*heat weldable*" is also referred to in the art as "*heat sealable*".

20 PCT Application published as PCT/US95/12264 discloses a container having a rectangular base and its manufacturing. The container in accordance with that earlier publication is manufactured of three sheets of material which in a first step in the process of manufacture are welded to one another so as to form a pouch and then, after forming the base into a rectangle, an additional
25 welding process is required for imparting the base a rectangular shape and imparting stability by welding some overlapping triangular portions thereof.

A considerable disadvantage of the disclosure in that publication is that the pouch is manufactured of three separate sheets of material, one of which being heat weldable on both faces thereof and two others being heat

weldable at least at one face thereof. This arrangement is, on the one hand, rather expensive and, on the other hand, requires complex machinery and large space for manufacturing the container.

It is an object of the present invention to provide a novel and improved
5 container and a process for manufacturing same, in which the above-referred to disadvantages are substantially reduced or overcome.

SUMMARY OF THE INVENTION

According to the present invention there is provided a container having a base and walls extending upwards therefrom, the container formed
10 out of a single film of material in which at least an inner face is made of a heat weldable material;

two side edges of the film sheet are welded to one another and overlapping portions of a bottom edge of the film sheet are welded to one another;

15 the container characterized in that:

it comprises an essentially rigid skirt portion extending at an essentially right angle bellow the base and formed in a regular geometric shape;

the containers base assumes a shape corresponding to the shape of the
20 skirt portion;

the shape of the skirt portion is fixed by welding overlapping portions of the walls to one another.

By a preferred embodiment of the present invention, the base of the container is a rectangle. In such a case, the container is reinforced by welded
25 seams upwardly extending from the base, along side edges of the container.

However, by different embodiments of the invention, the base may assume a circular or other regular polygon shape.

In accordance with another specific embodiment, the bottom edge of the film sheet is formed with one or more gussets. Such one or more gussets may be formed also at the top edge of the container.

By another aspect of the present invention there is provided a process
5 for the manufacture of a container having a base and walls extending upwards therefrom, the process characterized by the following steps:

(a) preparing a pouch formed out of a single film of material in which at least an inner face is made of a heat weldable material; wherein two side edges of the film sheet are welded to one another over a filler or forming
10 tube of a pouch-forming device, and overlapping portions of a bottom edge of the film sheet are welded to one another;

(b) expanding at least a bottom portion of the pouch into a desired regular geometric shape over the filler or forming tube, whereby the base assumes said regular geometric shape;

15 (c) displacing the base inwardly into the pouch to obtain a skirt portion made of overlapping wall portions and extending at an essentially right angle bellow the base and having the shape of said regular geometric shape;

(d) welding the overlapping wall portions to one another so as to
20 fix the skirt portion and impart it rigidity.

Typically, but not exclusively, the container in accordance with the present invention is manufactured in a continuous process of the *form-fill-seal* type (horizontal or vertical). Accordingly, prior or after step (d), the container is filled with contents and is then sealed by heat welding or by other means
25 (such as zippers, overlapping, folding, etc.). For assuming a rectangular shape of the base, the filler tube has a rectangular shape. In case of a container having a rectangular base, prior to filling the container is reinforced by welded seams upwardly extending from the base along side edges of the container.

Displacing the base into the pouch for facilitating the manufacturing process of the present invention is carried out by a forming block having a shape corresponding to the regular geometric shape to be assumed. Typically such a forming block is formed with a recess for receiving sealed portions of the base. Alternatively, the forming block may be laterally expandable.

The process according to the present invention may further comprise prior to or after step (d) the filling of the container through said filler tube.

An important aspect of the present invention is forming the regular geometric shape which is a welded portion having increased rigidity with respect to other portions of the container, for imparting the container its stability.

BRIEF DESCRIPTION OF THE DRAWINGS

For better understanding, the invention will now be described by way of example only, in a non-limiting manner, with reference to the accompanying drawings in which:

Fig. 1 is a perspective view from below of a container in accordance with a preferred embodiment of the present invention;

Fig. 2 is a schematic illustration of a vertical form-fill-seal configuration for producing a container in accordance with the embodiment seen in Fig. 1;

Figs. 3A-3D are cross-sectional views through level III-III in Fig. 2, illustrating consecutive steps of forming longitudinal seams in the container of Fig. 1;

Figs. 4A-4E are cross-sectional views through level IV-IV in Fig. 2, illustrating consecutive steps of forming a rectangular base in accordance with the preferred embodiment of Fig. 1;

Figs. 5A-5D illustrate consecutive steps at level IV-IV in Fig. 2, in which a different forming block is used;

Fig. 6 is an isometric view from below of a second embodiment of a container of the present invention;

Fig. 7 is a perspective view of a process for the manufacture of a container in accordance with Fig. 6;

5 Fig. 8A illustrates a pouch useful in the process of manufacturing a container in accordance with the present invention, the pouch comprising gussets;

Fig. 8B illustrates a pouch useful in the process of manufacturing a container in accordance with the present invention, the pouch comprising no
10 gussets; and

Figs. 9A and 9B schematically illustrate an improvement in the final step of manufacturing a container in accordance with the first embodiment of the present invention.

15 DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Attention is first directed to Fig. 1 illustrating a container in accordance with a first, preferred embodiment of the present invention. The container generally designated 20 has a general shape of a pouch or bag with a rectangular base 22 formed with a skirt portion 24 below base 26 and
20 having front and rear walls 28 (only front wall seen) and side walls 30.

The container 22 is fitted with seamed side edges 34 and is seal welded at its top 38.

Further attention is now directed to Fig. 2 schematically illustrating a process of manufacturing a container in accordance with Fig. 1.

25 At a first stage, generally designated A, a pouch is formed in a manner as known *per se* and as often referred to as "VFFS" (*vertical form-fill-seal*). A web roll 50 dispenses sheet material 52 having at least its upper face 54 coated or made of a heat sealable material. The material is fed through a series of rollers 56 for maintaining minimum tension and controlling the

tension and feed rate of the film sheet. The film sheet 52 is then fed to a bag-forming collar 58 which is associated with a feeding tube 60 having a feeding neck 61. The collar 58 receives the film 52 and changes the film travel from a flat plane and shapes it around the feeding tube 60. As the film
5 moves down around the feeding tube 60, the film is overlapped at 62 for longitudinal fin-type sealing at sealing unit 64. As the material moves down by aid of draw-down belts 68, the packaging sleeve designated 69 advances a predetermined distance that equals the desired pouch-length dimension.

It should be noted that in the present sample, the film 52 has an inner
10 surface thereof 54 which is heat sealable and accordingly the fin-type seal technique is used. However, other types of longitudinal sealing techniques may be applied, e.g. lap-seal, gusset-seal, back-seal, etc., providing that the film material is heat weldable at both faces thereof, as known *per se*.

The cylindrical cross-section of the feeding tube 60 gradually changes
15 at 70 into a rectangular cross-section at a lower portion 72 which rectangular cross-section has external dimensions corresponding with the shape and size of the container's base as will hereinafter be explained.

As the film 52 passes the longitudinal sealing unit 64, the sleeve 69 travels over the intermediate portion 70 and then over the rectangular
20 portion 72, assuming the rectangular shape thereof.

In the next step which is designated B and better seen in Figs. 3A-3D, longitudinal seams 34 (see Fig. 1) are formed along the container's edges. The seam-forming stage B consists of two pressure plates 76 fitted for horizontal displacement and two welding plates 78 each formed at its lateral
25 ends with a welding element and also fitted for horizontal displacement. In the step illustrated in Fig. 3B, pressure plates 76 have been displaced in the direction of arrows 82 against the feeding tube 72. It can be seen that slack material designated 84 of sleeve 69 is formed at the edges of the feeding tube 72. In the position of Fig. 3C, welding plates 78 apply pressure in the

direction of arrows 86 and welding elements 80 apply heat onto the slack material 84, whereby seams 34 are generated, as seen in Fig. 3D and as known *per se*.

At a first stage, a cross-sealing jaw assembly 96 which can be seen in
5 enlarged portion II of Fig. 2 comprises top and bottom sealing segments 97 and 98 with an intermediate cut-off knife 99. Upon displacement of the cross-sealing assembly 96 in the direction of arrows 100, the top-sealing segment 97 seals the bottom 107 of a first pouch suspended down from the rectangular feeding tube 72 and that the bottom segment 98 seals the top of an
10 already filled container as known in the art. The cut-off knife 99 (which can be a knife or a hot wire) operates during the jaw closing-sealing operation in a separating motion. At the end of this step a pouch 106 is formed as can be seen, for example, in Fig. 7A.

In a further stage of the process which in Fig. 2 is generally
15 designated C, a pouch is formed by sealing the bottom edge of the sleeve 69 and then a rectangular base is shaped and reinforced as follows from the disclosure of Figs. 4A-4E.

Further attention is now directed to Figs. 4A-4E for illustrating how a rectangular, reinforced base is formed. In a first step seen in Fig. 4A, a
20 triangular shaped mechanical tucker 108 (see also Fig. 1) is displaced in the directions of arrows 110 thus forming gussets 112 at bottom sealing 107 assuming the shape seen in Fig. 4B, wherein the bottom portion of the pouch 106 already assumes a rectangular portion as seen in Fig. 4B.

After withdrawal of the mechanical tuckers 108, a base forming
25 unit 116 is activated, which unit 116 comprises a vertically displaceable forming block/stamp 118 and lateral welding members 120. In Fig. 4D, the forming block 118 is displaced in the direction of arrow 124 in a direction displacing base 26 into the pouch 106, thus forming overlapping wall portions 128. Then, the rectangular tube 72 is slightly retracted in the

direction of arrow 130 and simultaneously welding units 120 displace in the direction of arrows 132 for welding the overlapping portions 128.

It will be noticed that the welded portion (best seen in Fig. 1 - designated 24) constitutes a circumferential essentially stiff, reinforced skirt portion depending downward from the base 26 essentially at a right angle with respect thereto.

Further attention is now directed to Figs. 5A-5D illustrating another embodiment of a base forming block generally designated 140 which consists of two symmetrical stamp components 142 which are displaceable both in a vertical direction and in a horizontal direction. The remaining components and principles remain as explained hereinabove with reference to Figs. 4. In Fig. 5A, the forming members 142 are separated from one another for receiving therebetween the welded bottom end 107 of pouch 106. In Fig. 5B, the stamp members 142 are displaced in the direction of arrows 144 sealing together the gusseted ends 107' of bottom weld 107 (see Fig. 4B). In Fig. 5C, the forming block assembly 140 displaces in the direction of arrow 148, displacing base 26 into the pouch 106, as explained hereinabove in connection with Fig. 4D. In Fig. 5D, welding members 120 are displaced in the direction of arrows 132 whereby the overlapping ball portions 128 are welded as explained herein above, obtaining the rectangular reinforced skirt portion 24 which is circumferential.

Other shapes of containers may be manufactured as well. Examples of such shapes may be any regular polygon, e.g. triangular, pentagon, etc. or a circular-base container. In Fig. 6 there is illustrated a container 160 having a circular base 162 from which a circumferential reinforced circular portion 164 depends at an essentially right angle with respect thereto. The process of manufacture of a base portion having a cross-section other than rectangular is principally similar to that described in the previous embodiment, the main

difference residing in the shape of the filler tube and the components of step (C).

Fig. 7 illustrates a schematical process for manufacturing the container of Fig. 6, differing from the device seen in Fig. 2 in that the feeding tube 62 remains circular along the entire length, and no seaming unit is provided. In addition, the base forming portion indicated in Fig. 7 as D comprises a circular cross-sectional forming block 168 and four annular welding segments 170 radially displaceable along arrows 172. The steps in obtaining the base 162 and the circumferential reinforcing skirt 164 are analogous to those disclosed in connection with the previous embodiment as may be well appreciated by a person versed in the art.

In Fig. 8B, a pouch generally designated 180 is illustrated in which the bottom welded portion 182 is not gusseted and it will be appreciated that such pouches may also be used in the process of manufacturing a container in accordance with the present invention. It will be realized that the gussets (or "tucks" as referred to at times) are merely for the purpose of eye pleasing and eliminate the end flair 184 at the sealing zone 182.

As will further be appreciated, after the base of the container is formed, the container is filled through the filling tube which is fed from feeding neck 61 (see Fig. 2). Once the correct amount of loose substance (typically powdered or granulated material, although not limited thereto) is applied, the cross-sealing jaw assemblies 96 are activated, as explained hereinabove, thereby sealing the container at the top seal 38 (see Fig. 1).

In order to increase the rate of manufacturing, filling and sealing of the containers, it is possible to complete all steps of manufacturing the container up to the step of welding the circumferential reinforced skirt portion 24 and then, fill the semi-manufactured container and remove it to a welding station wherein the overlapping wall portions 128 are welded to one another as explained hereinabove. This procedure reduces manufacturing time since the

final welding process of steps 4E and 5D are the most time-consuming steps in the process of manufacturing the container in accordance with the present invention.

The arrangement described above is illustrated schematically in Figs. 9A and 9B wherein in Fig. 9A the container generally designated 200 has already assumed its rectangular shape, has been filled and its top end 38 sealed. However, the skirt portion 24 has not yet been sealed although overlapping portions 128 have already been formed. At this stage the container 200 is received from the previous forming step onto a rotatable work station 204 with welding jaws 206 and 208 in a disengaging position as seen in Fig. 9A. Upon rotation of the work place 204 in the direction of arrow 210, the welding jaws 206 and 208 displace into welding positions as seen in Fig. 9B whereby the reinforced skirt portion 24 is completed and the container then moves to a next station ready for shipment.

While preferred embodiments of the invention have been disclosed hereinabove with reference to vertical form-fill-seal configurations, it will be appreciated that other configurations are possible too, setting as an example horizontal form-fill-seal configurations, rotary single-lane configurations and so on. Furthermore, other shapes and forms of the reinforced base may be obtained and a skilled person will have no doubts in manipulating the disclosure as above to assume such shapes.

CLAIMS:

1. A container 20 having a base 22 and walls 28; 30 extending upwards therefrom, the container formed out of a single film of material 52 in which at least an inner face 54 is made of a heat weldable material;

5 two side edges of the film sheet are welded to one another and overlapping portions 62 of a bottom edge of the film sheet are welded to one another;

the container characterized in that:

10 it comprises an essentially rigid skirt portion 24 extending at an essentially right angle below the base 22 and formed in a regular geometric shape;

the container's base 22 assumes a shape corresponding to the shape of the skirt portion 24;

15 the shape of the skirt portion 24 is fixed by welding overlapping portions 128 of the walls to one another.

2. A container 20 according to claim 1, wherein the base 22 is rectangular.

3. A container according to claim 1, wherein the base is circular.

4. A container 160 according to claim 2, being reinforced by welded seams 34 upwardly extending from the base 22 along side edges of the container.

20 5. A container according to claim 1, wherein the bottom edge of the film sheet is formed with one or more gussets 112.

6. A process for the manufacture of a container 20 having a base 22 and walls 28; 30 extending upwards therefrom, the process characterized by the following steps:

25 (a) preparing (A) a pouch formed out of a single film 52 of material in which at least an inner face 54 is made of a heat weldable material; wherein two side edges of the film sheet are welded to one another over a filler or forming

tube 60 of a pouch-forming device, and overlapping portions 62 of a bottom edge of the film sheet are welded to one another;

(b) expanding (B) at least a bottom portion of the pouch into a desired regular geometric shape over the filler or forming tube, whereby the base assumes
5 said regular geometric shape;

(c) displacing the base inwardly 100 into the pouch to obtain a skirt portion made of overlapping wall portions and extending at an essentially right angle bellow the base and having the shape of said regular geometric shape;

(d) welding the overlapping wall portions 128 to one another so as to
10 fix the skirt portion 24 and impart it rigidity.

7. A process according to claim 6, wherein prior or after step (d) the container is filled with contents.

8. A process according to claim 6, wherein the filler or forming tube 72 has a rectangular shape.

15 9. A process according to claim 6, wherein the filler or forming tube 62 has a circular shape.

10. A process according to claim 8, wherein prior to filling, the container is reinforced by welded seams 34 upwardly extending from the base 22 along side edges of the container.

20 11. A process according to claim 8, wherein the bottom end of the pouch is formed with one or more gussets 112.

12. A process according to claim 6, wherein the bottom edge of the pouch is formed with a gusset 112.

25 13. A process according to claim 6, wherein displacing the base into the pouch is carried out by a forming block 118 having a shape corresponding to the regular geometric shape.

14. A process according to claim 6, wherein prior to or after step (d) the container is filled through the filler tube 60.

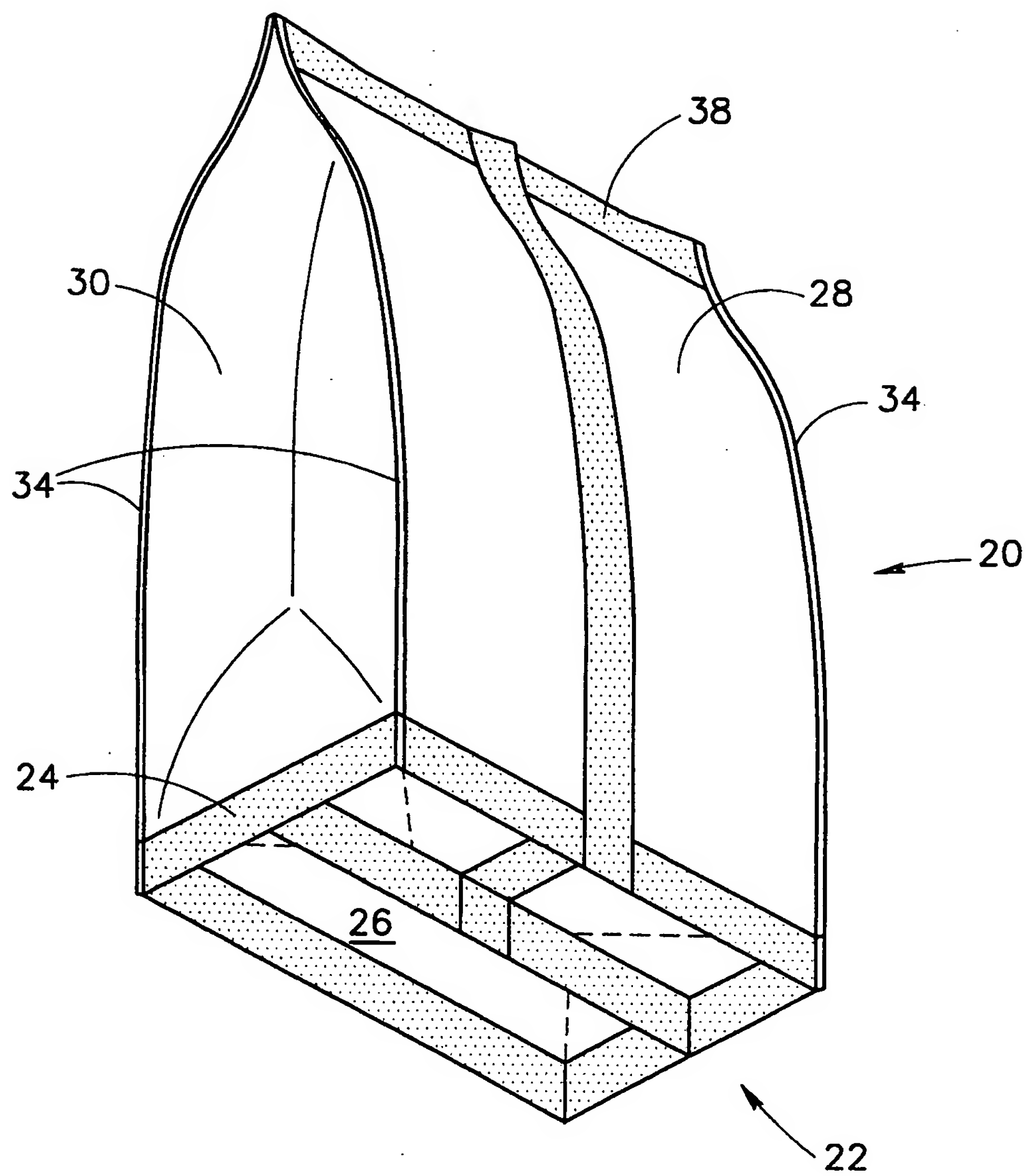


FIG. 1

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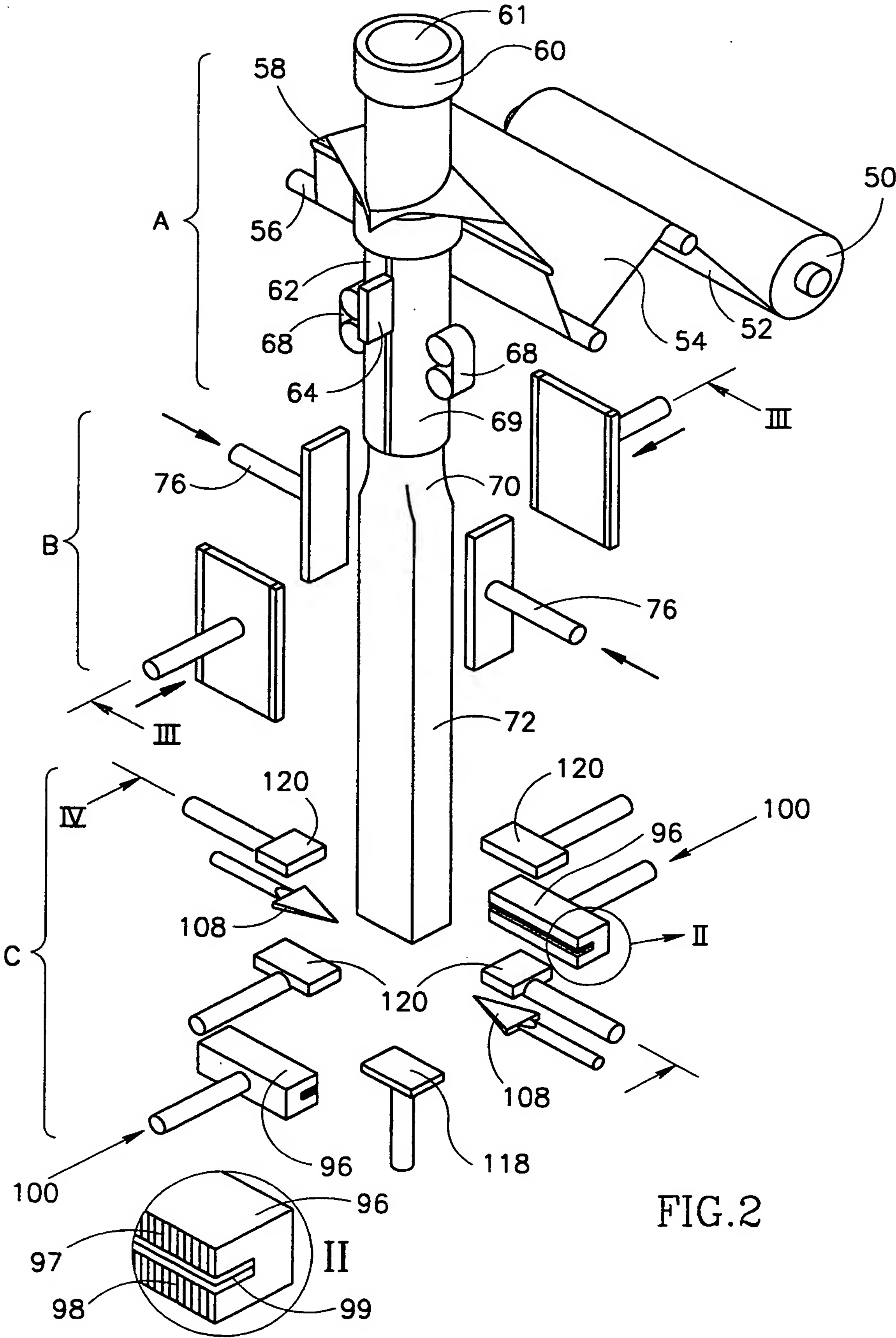
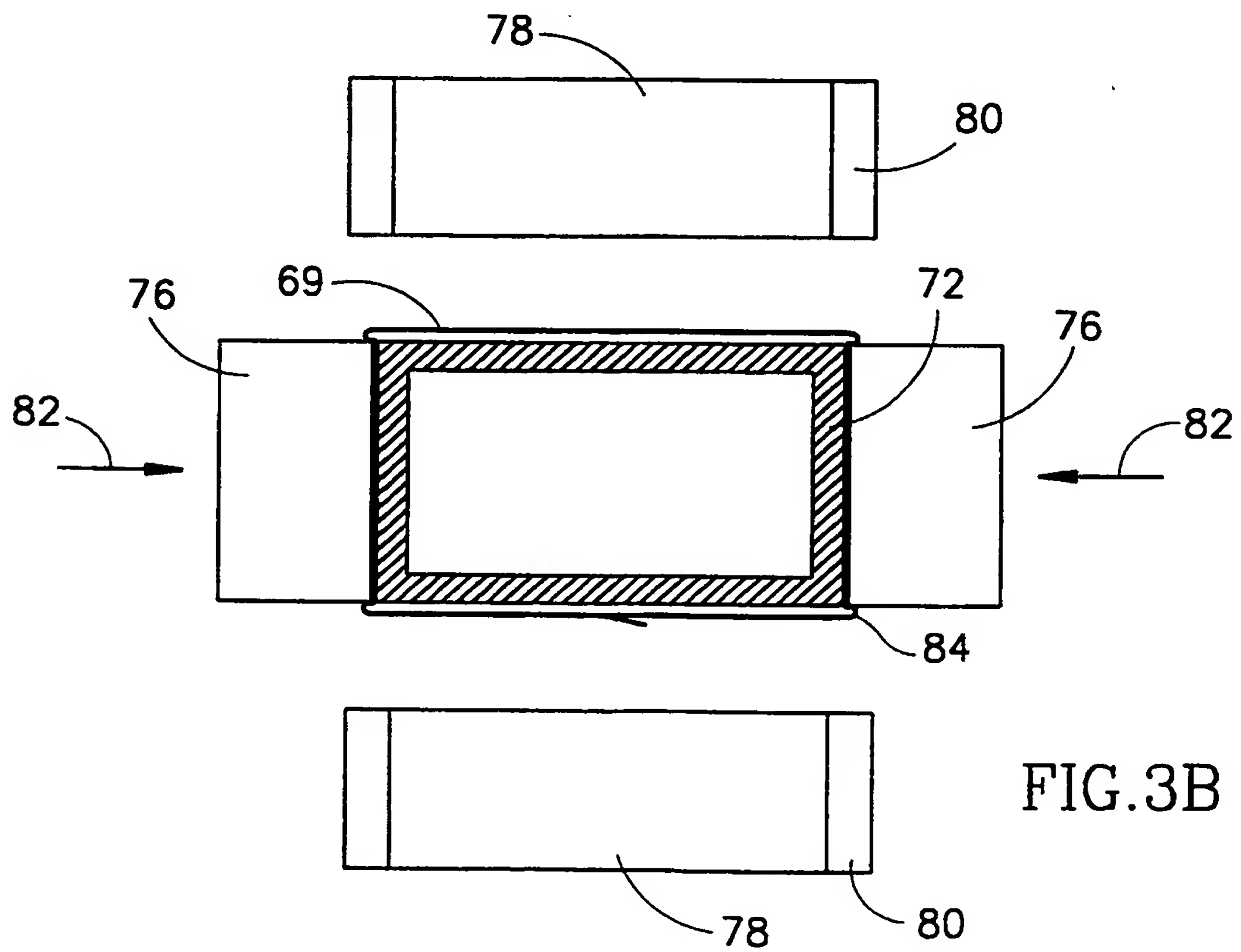
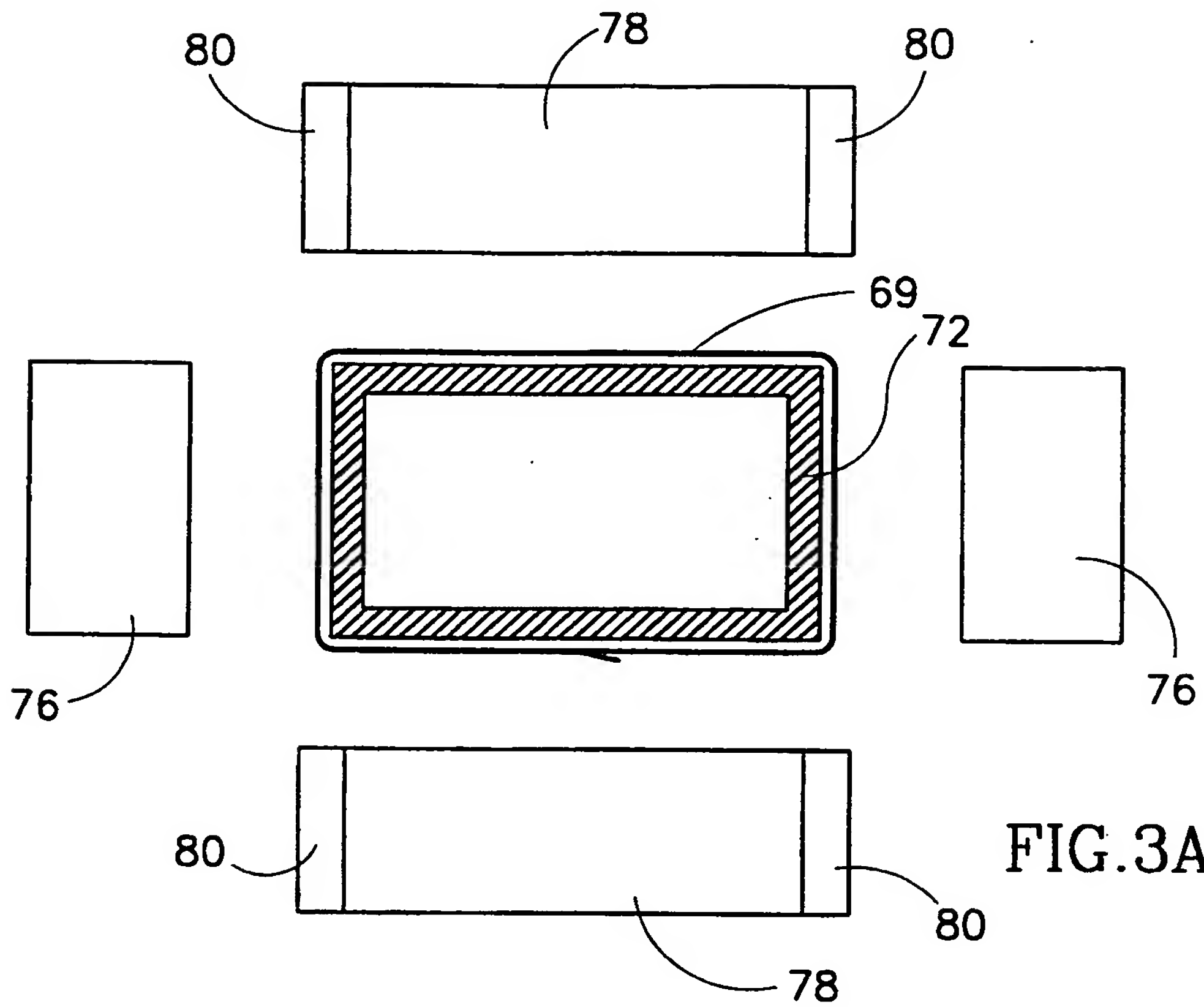


FIG.2

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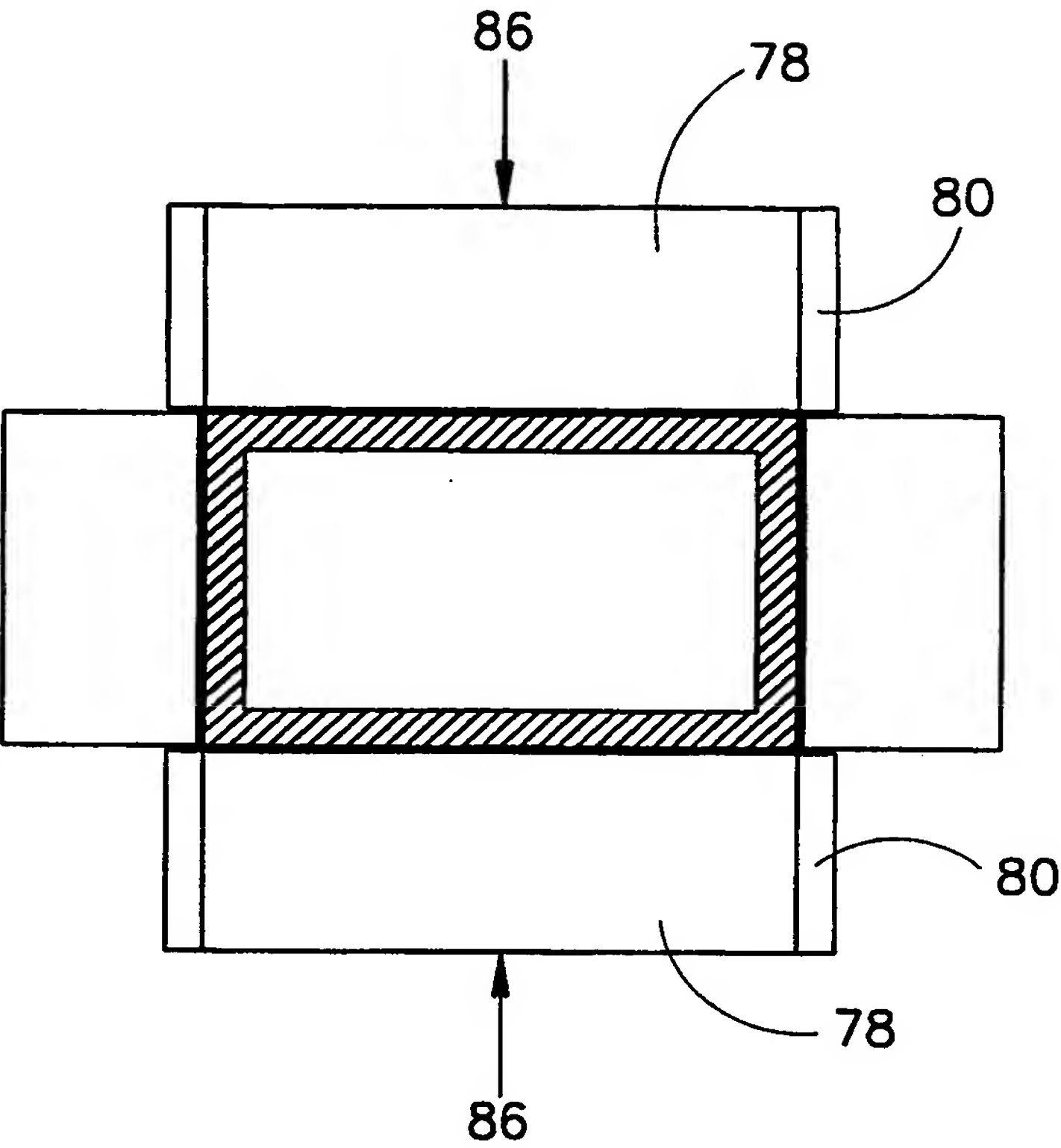


FIG.3C

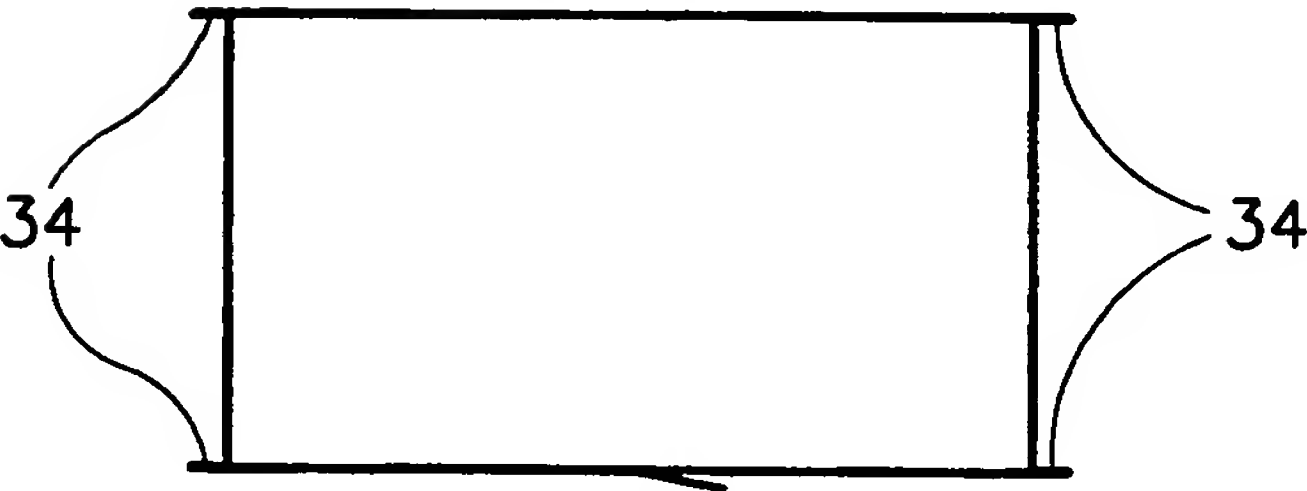


FIG.3D

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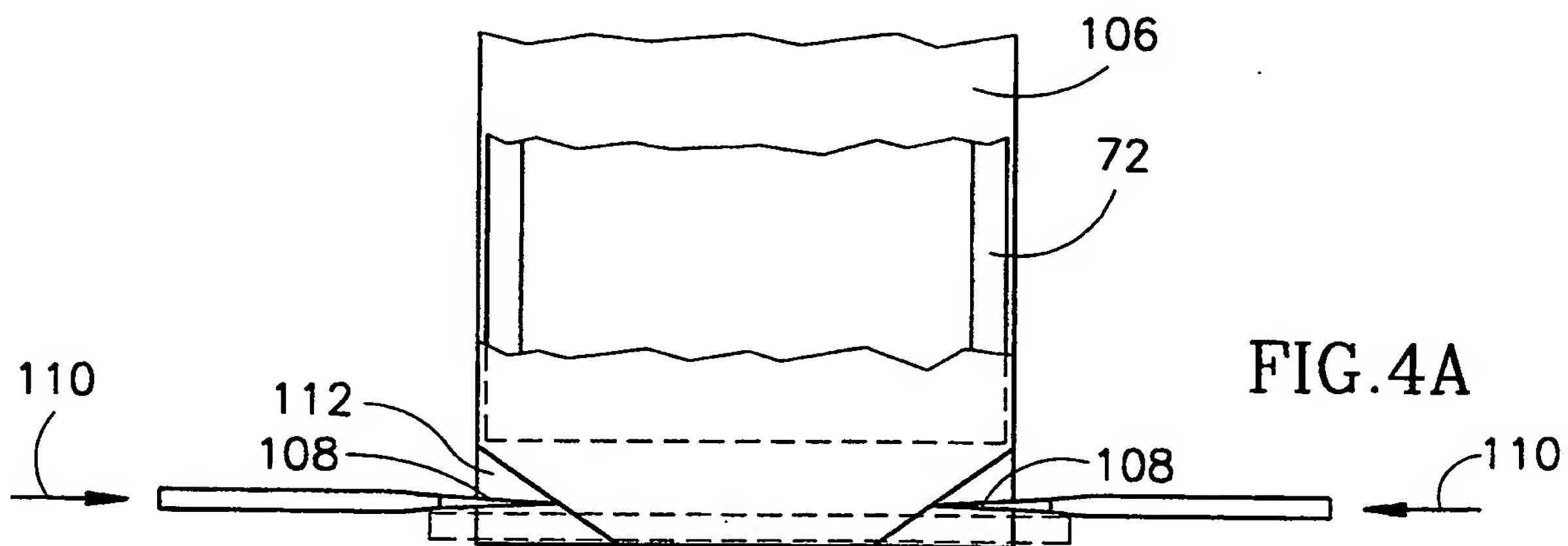


FIG. 4A

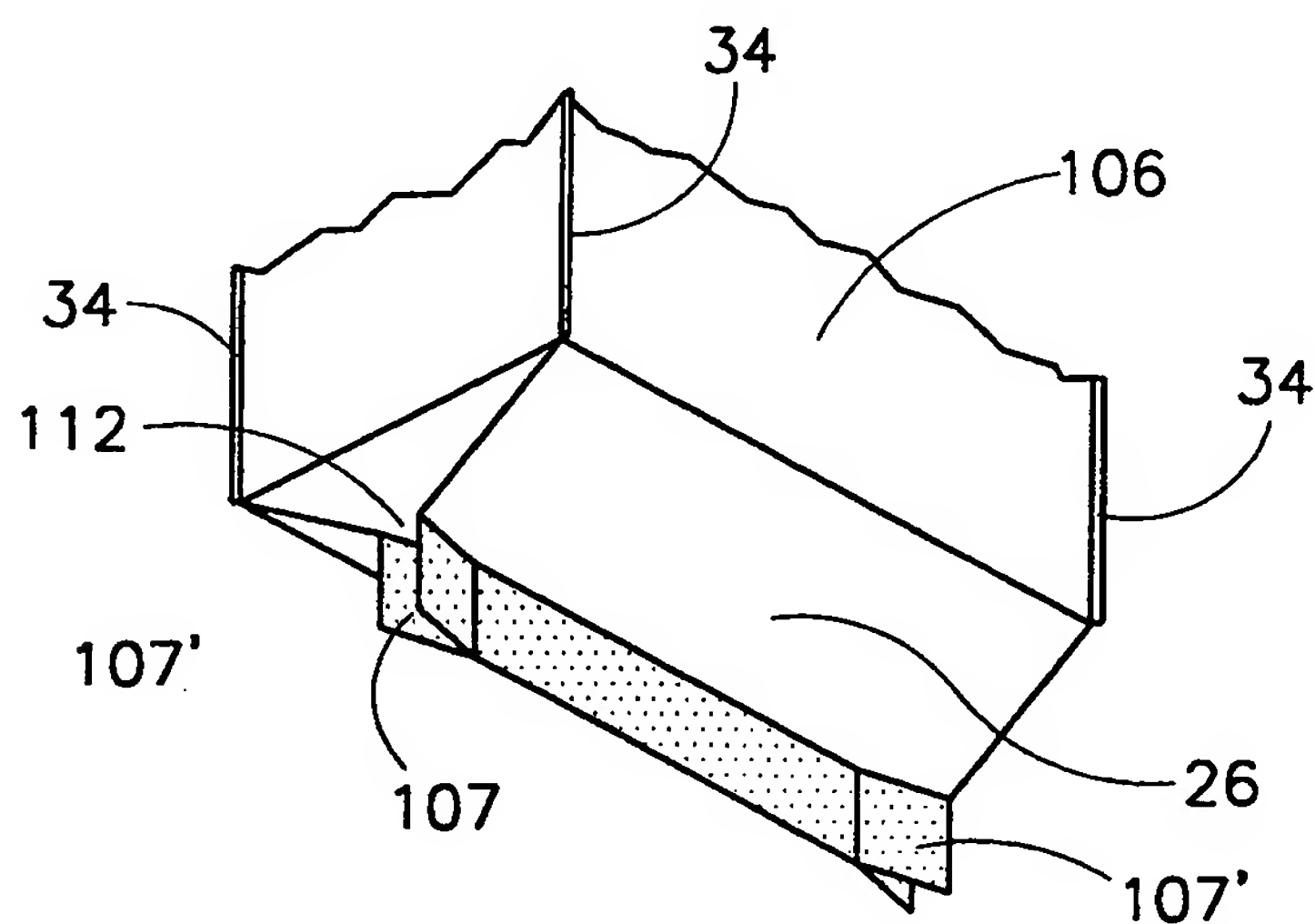


FIG. 4B

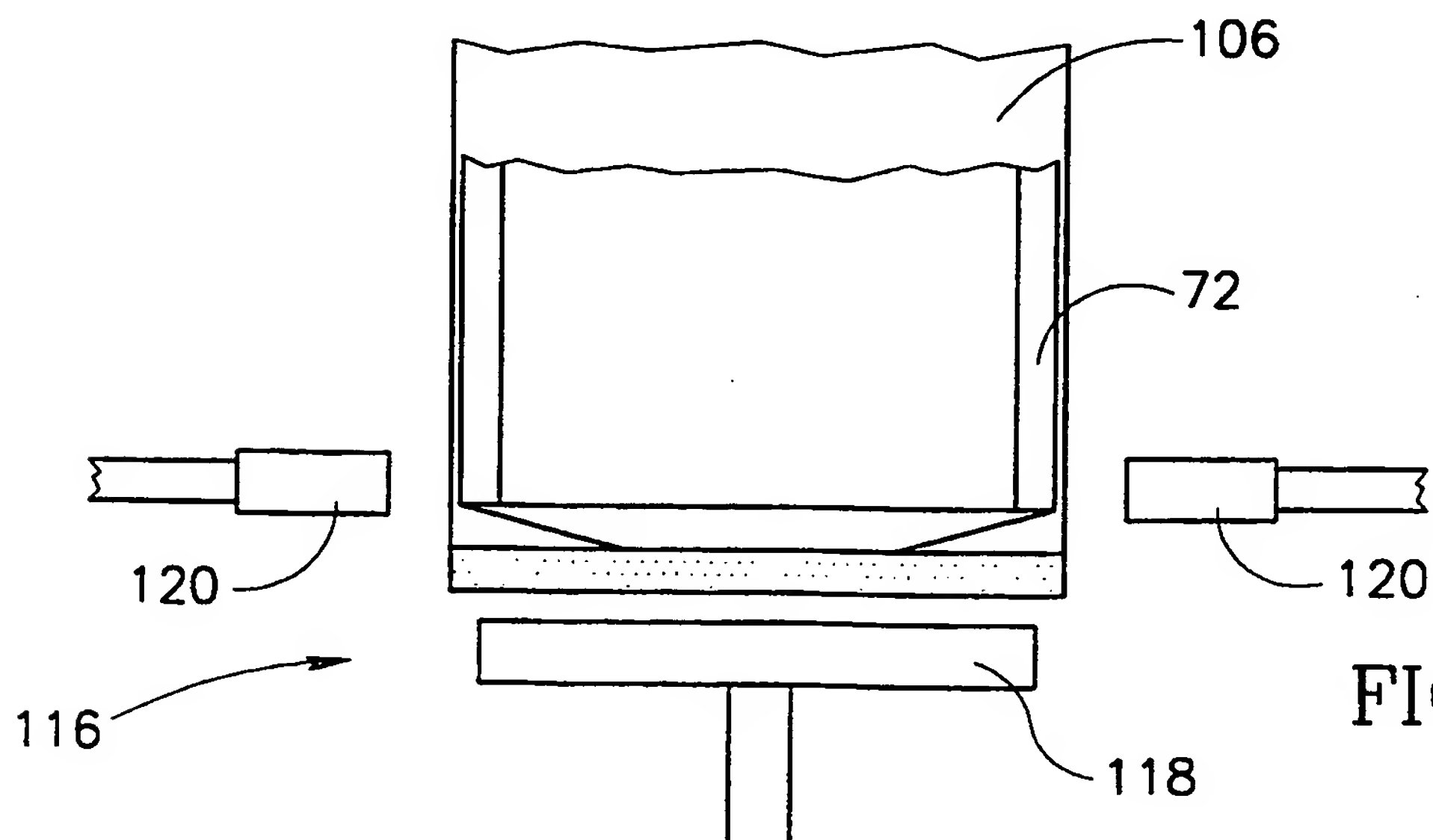


FIG. 4C

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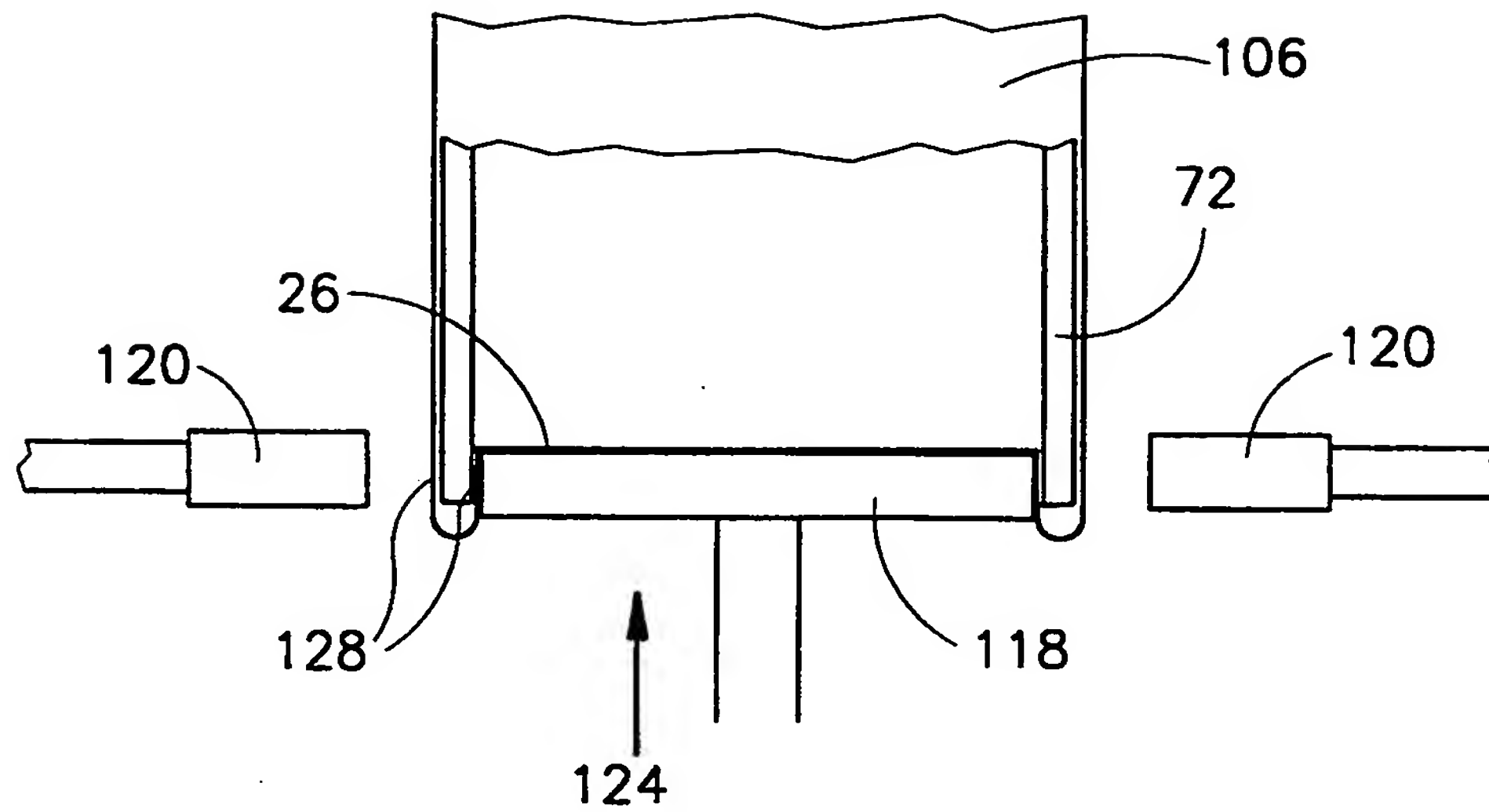


FIG. 4D

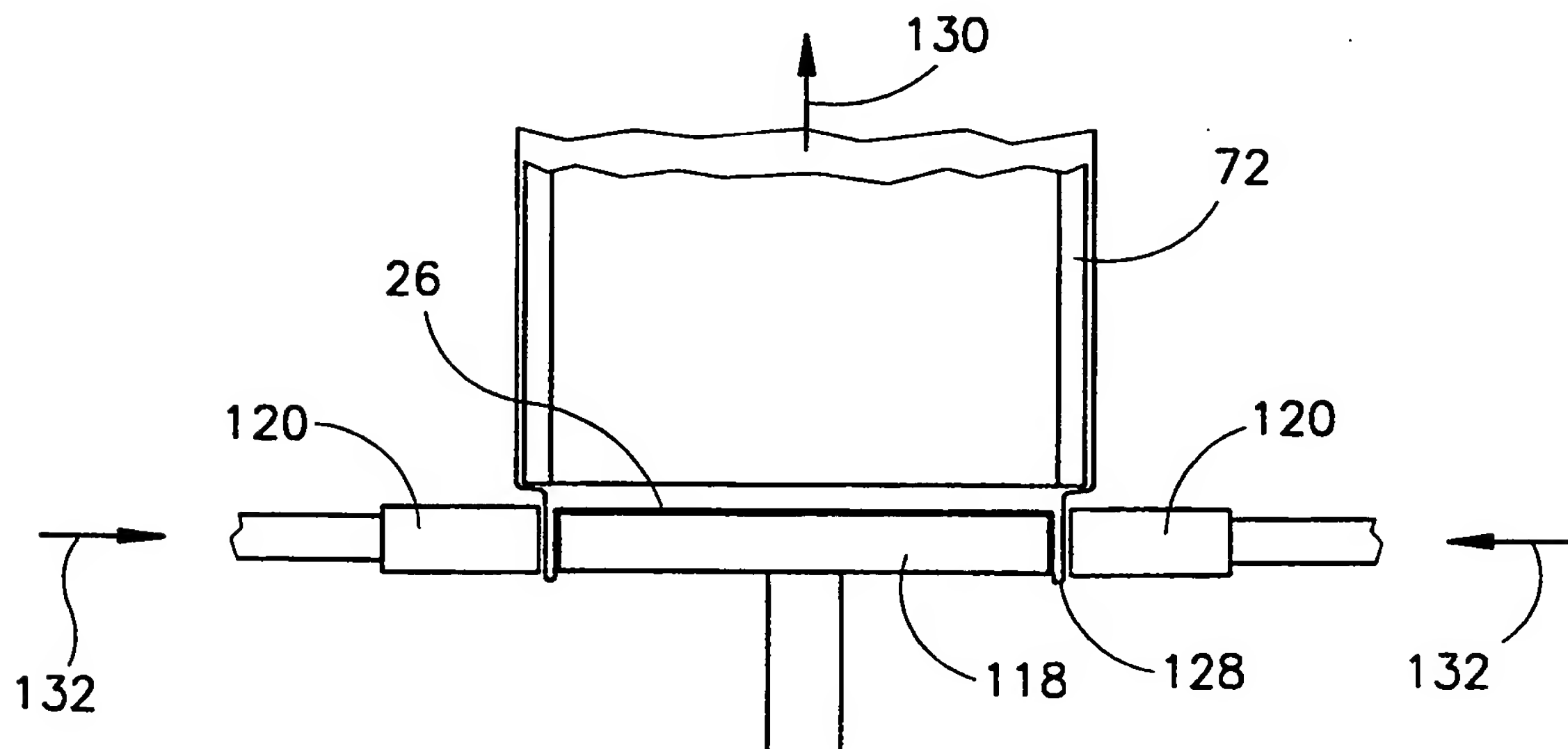
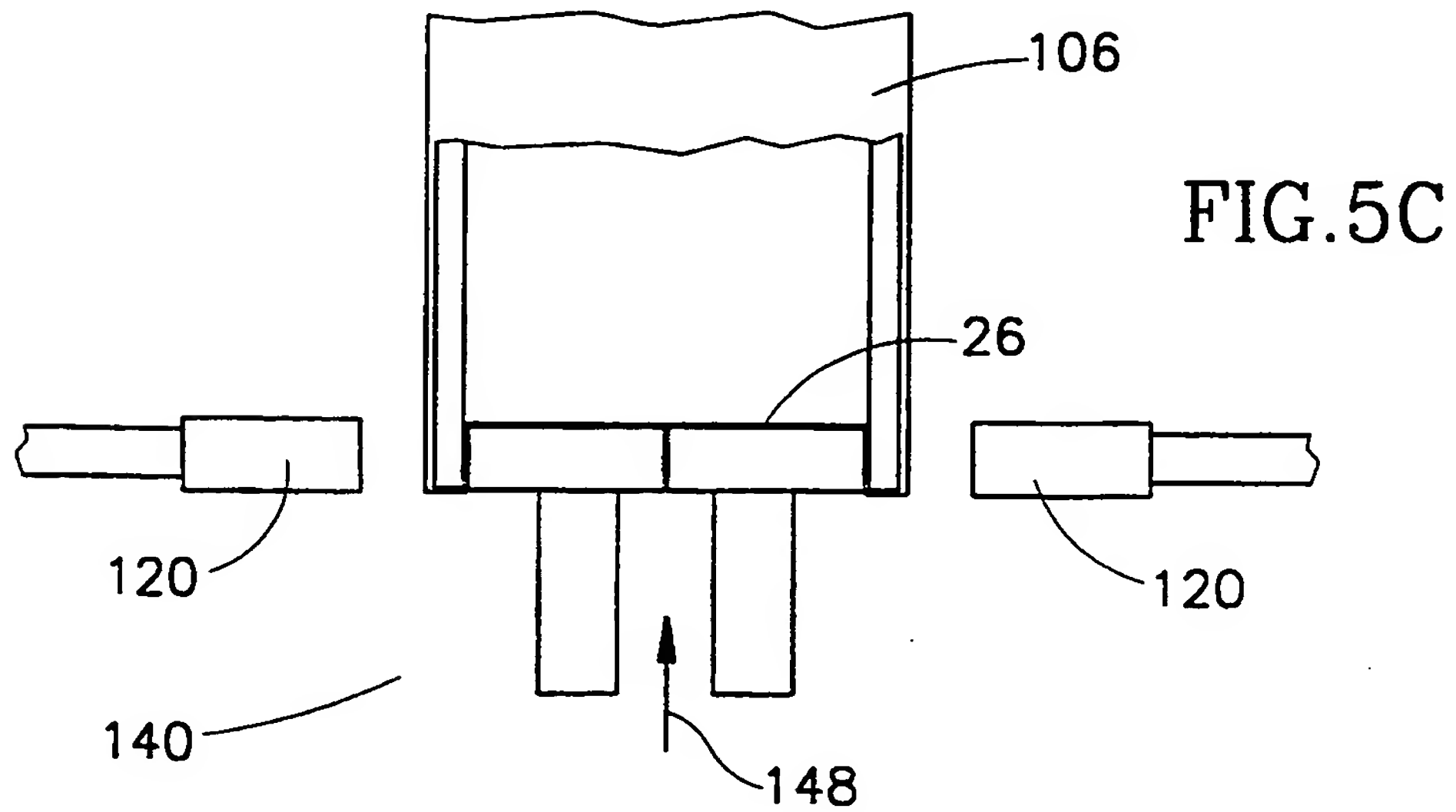
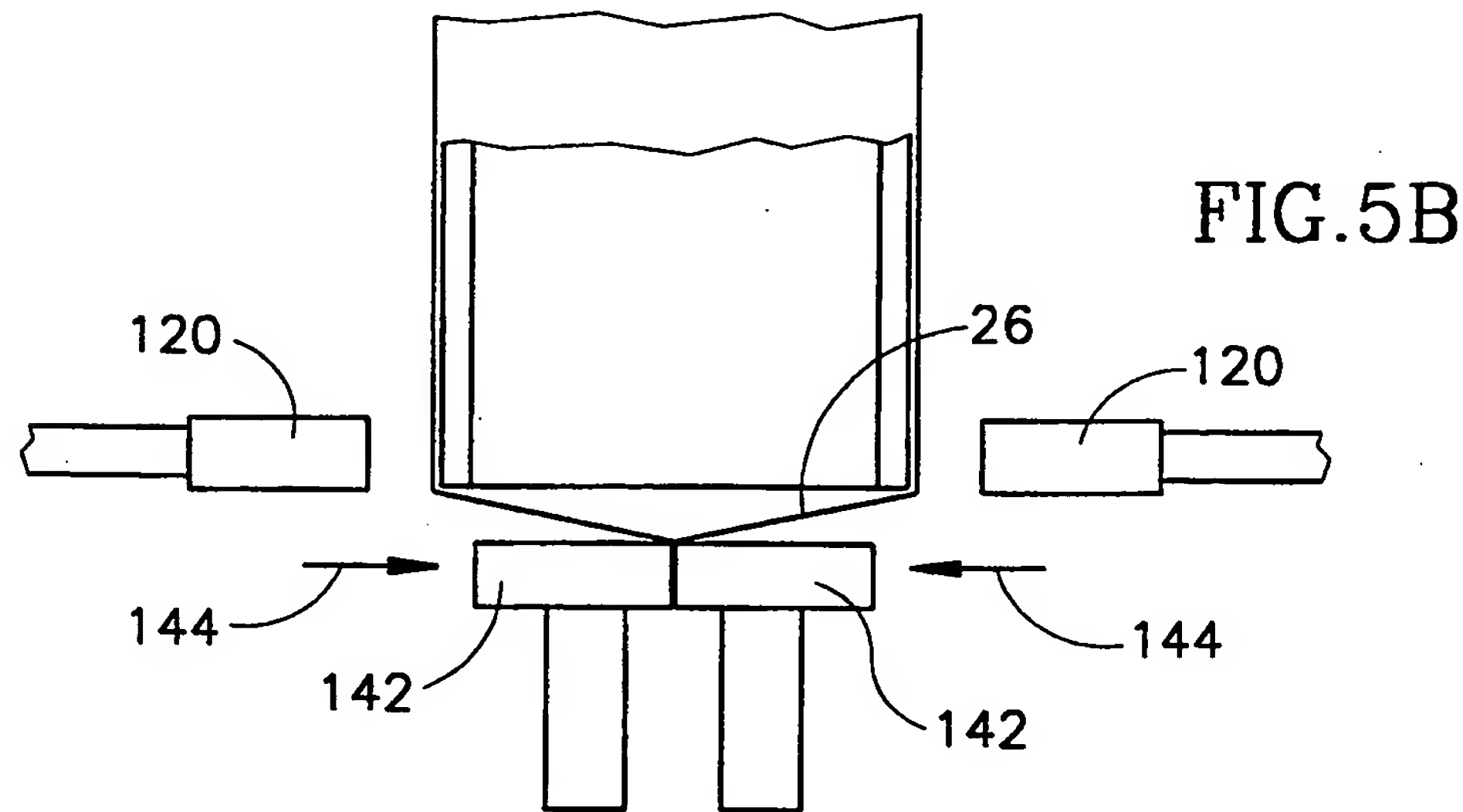
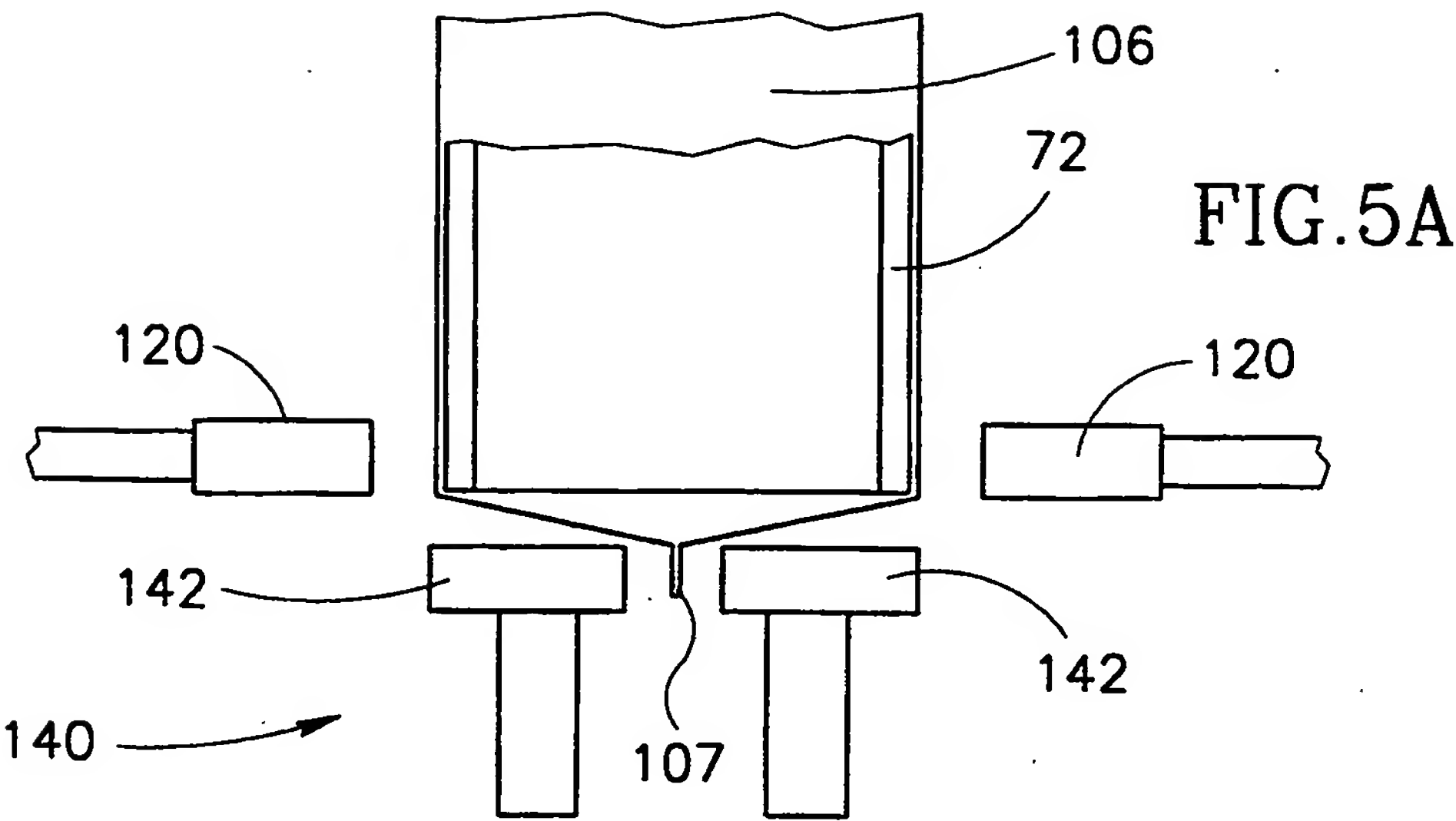


FIG. 4E

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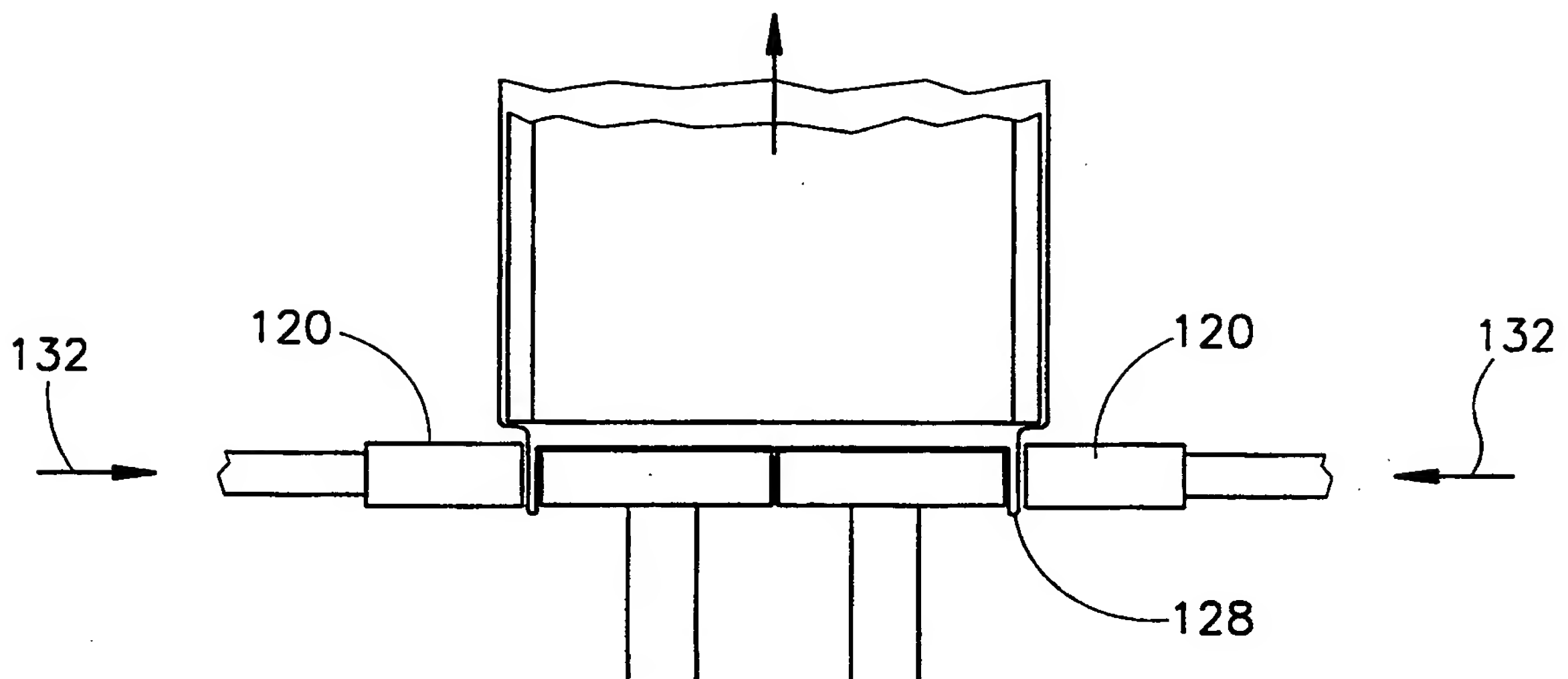


FIG.5D

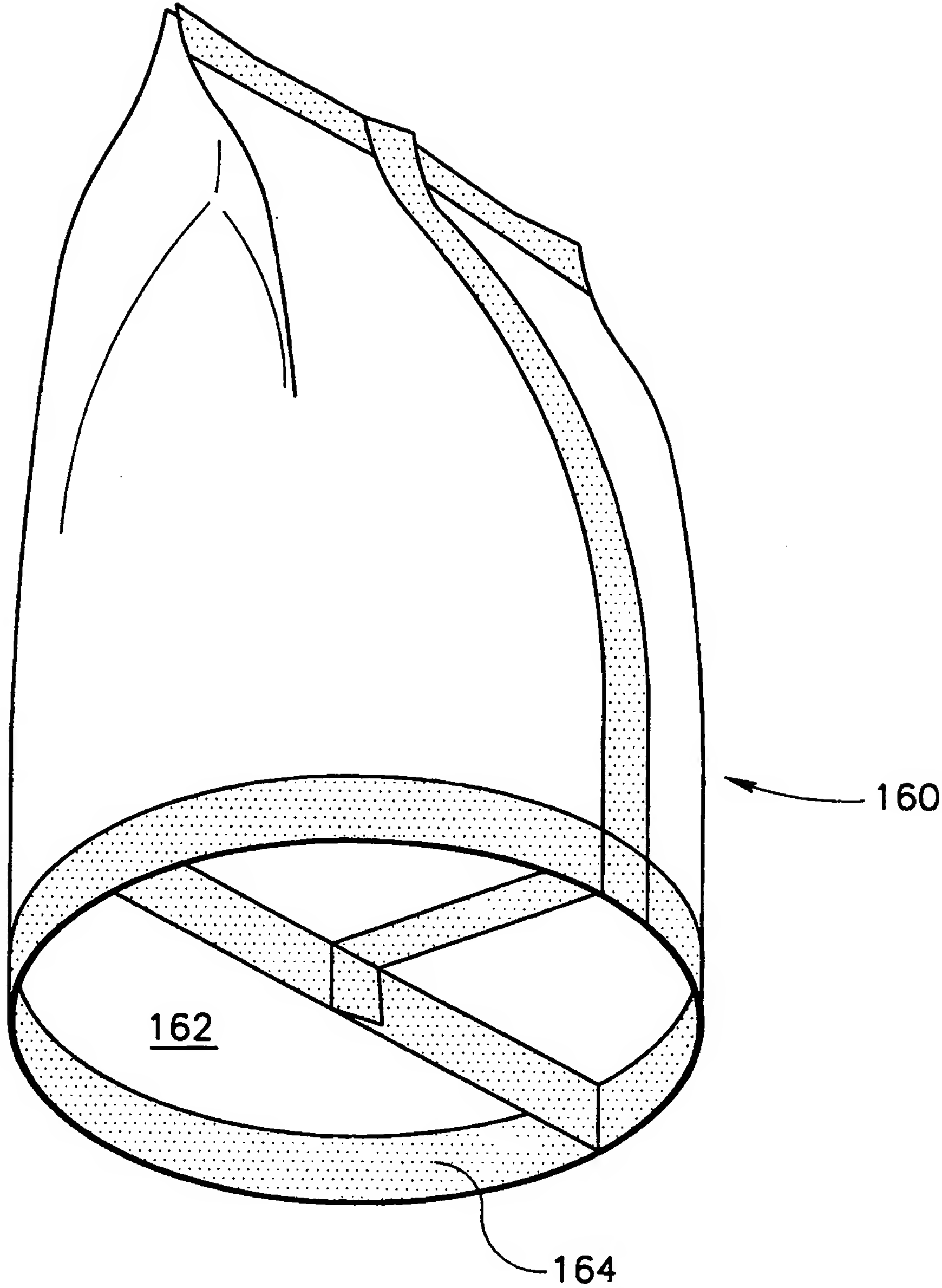


FIG.6

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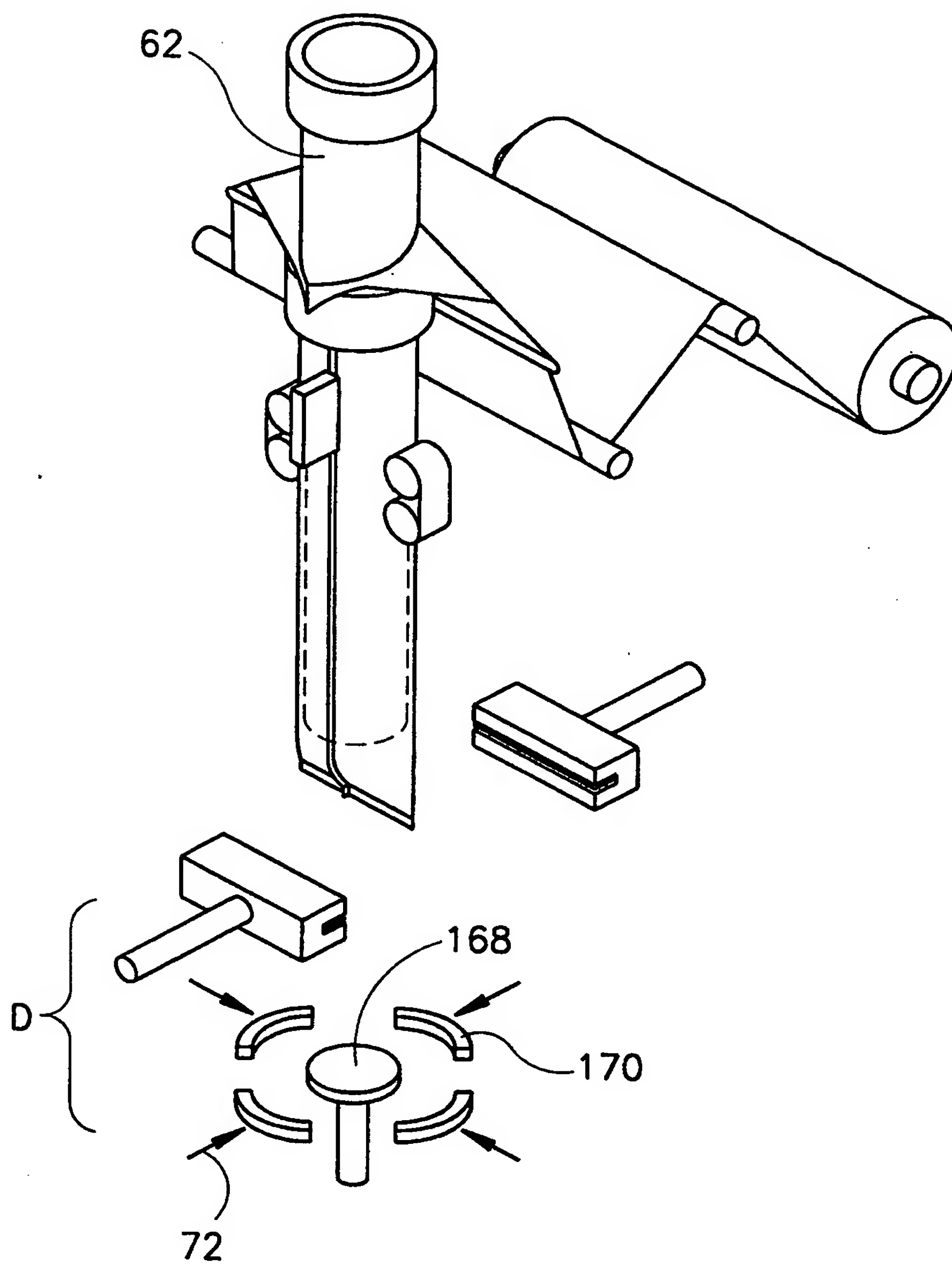


FIG. 7

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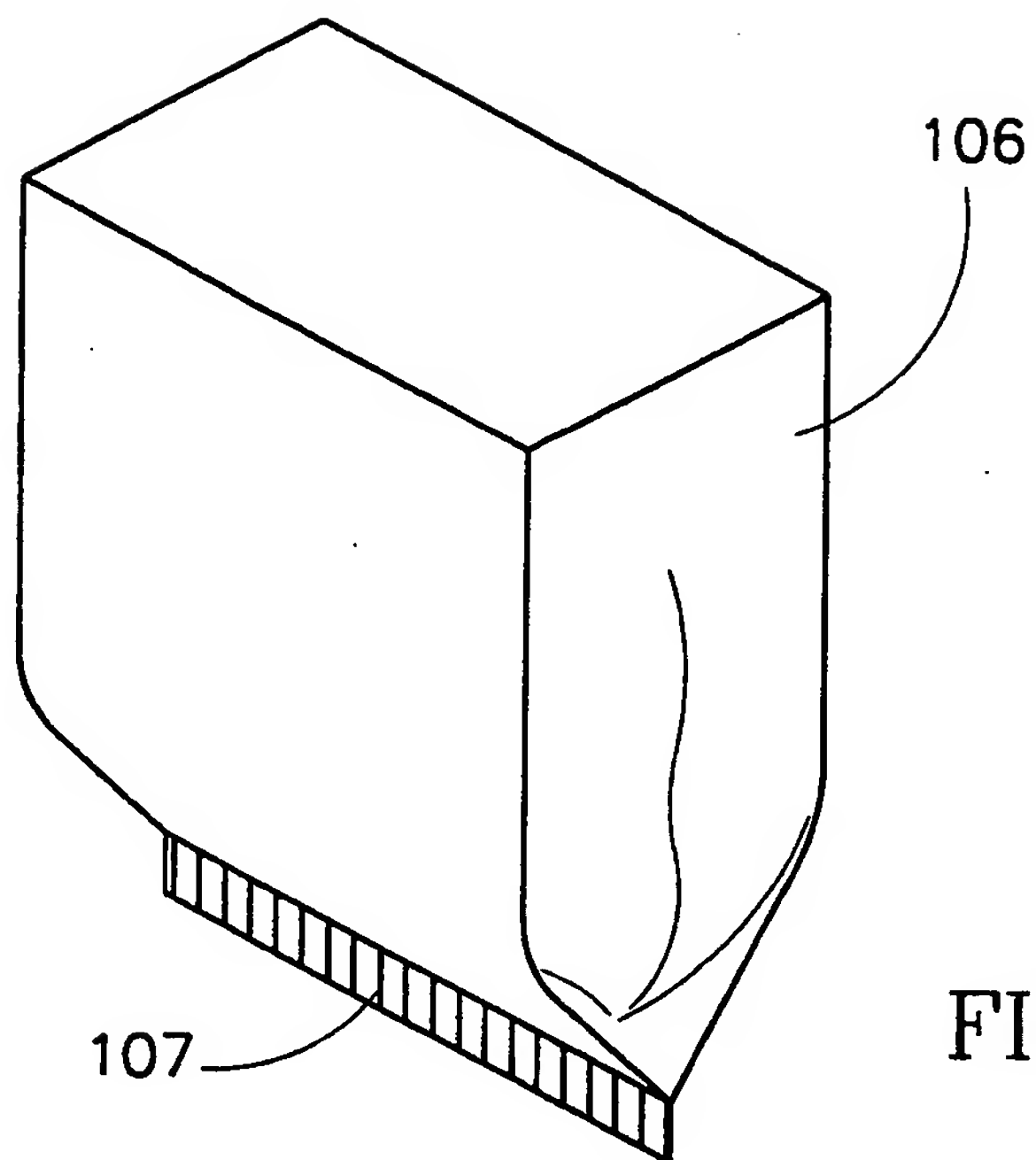


FIG. 8A

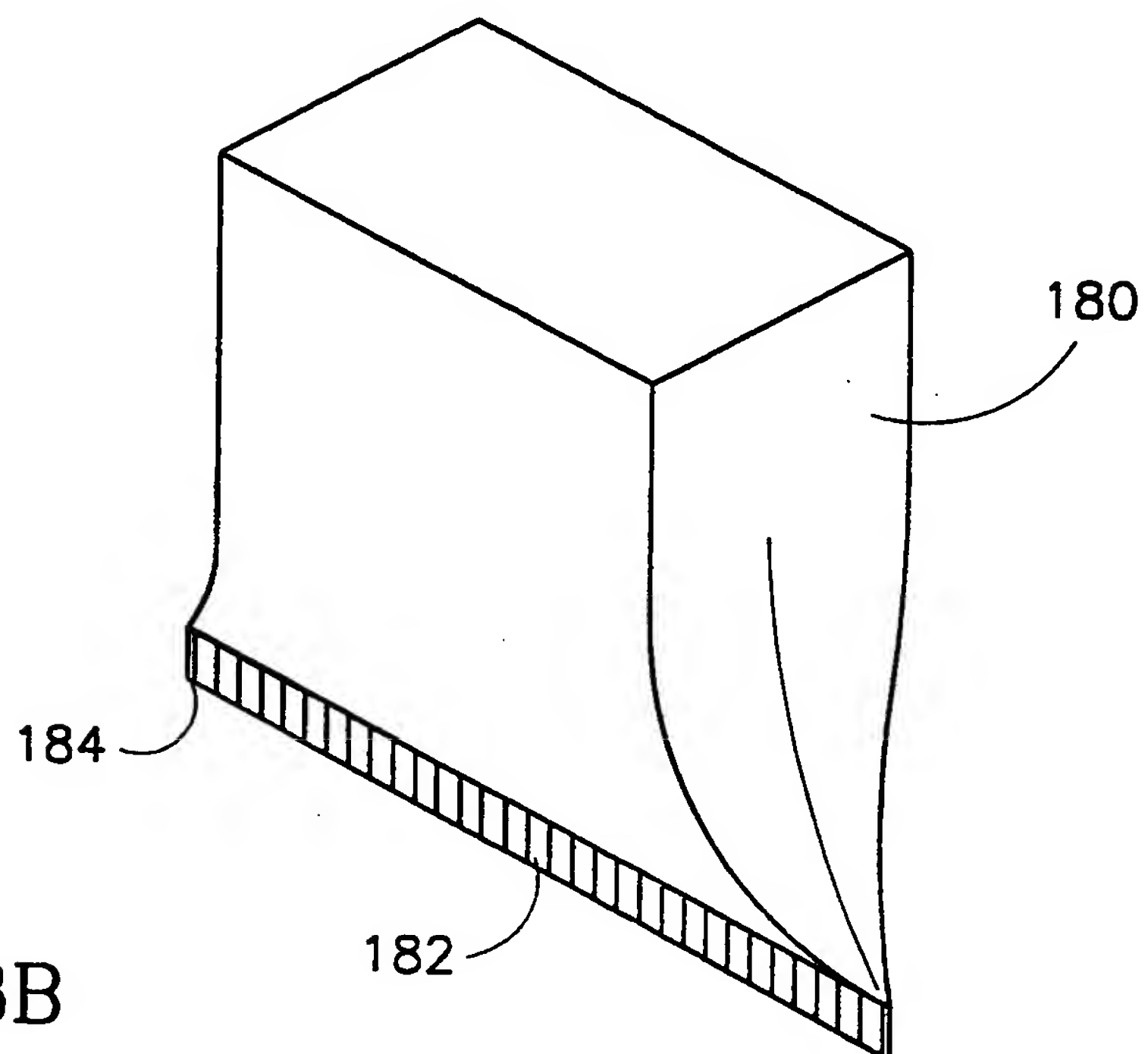


FIG. 8B

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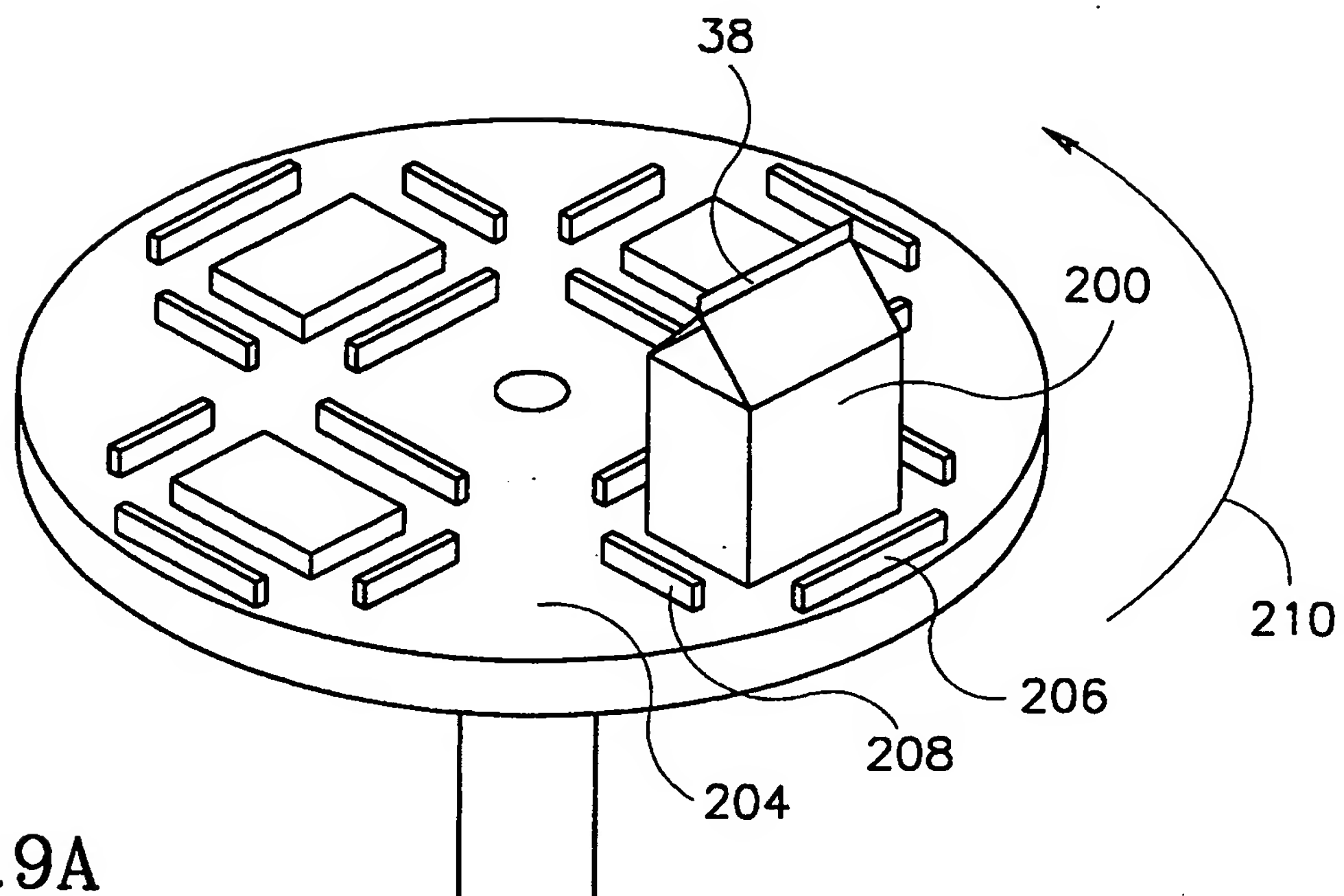


FIG. 9A

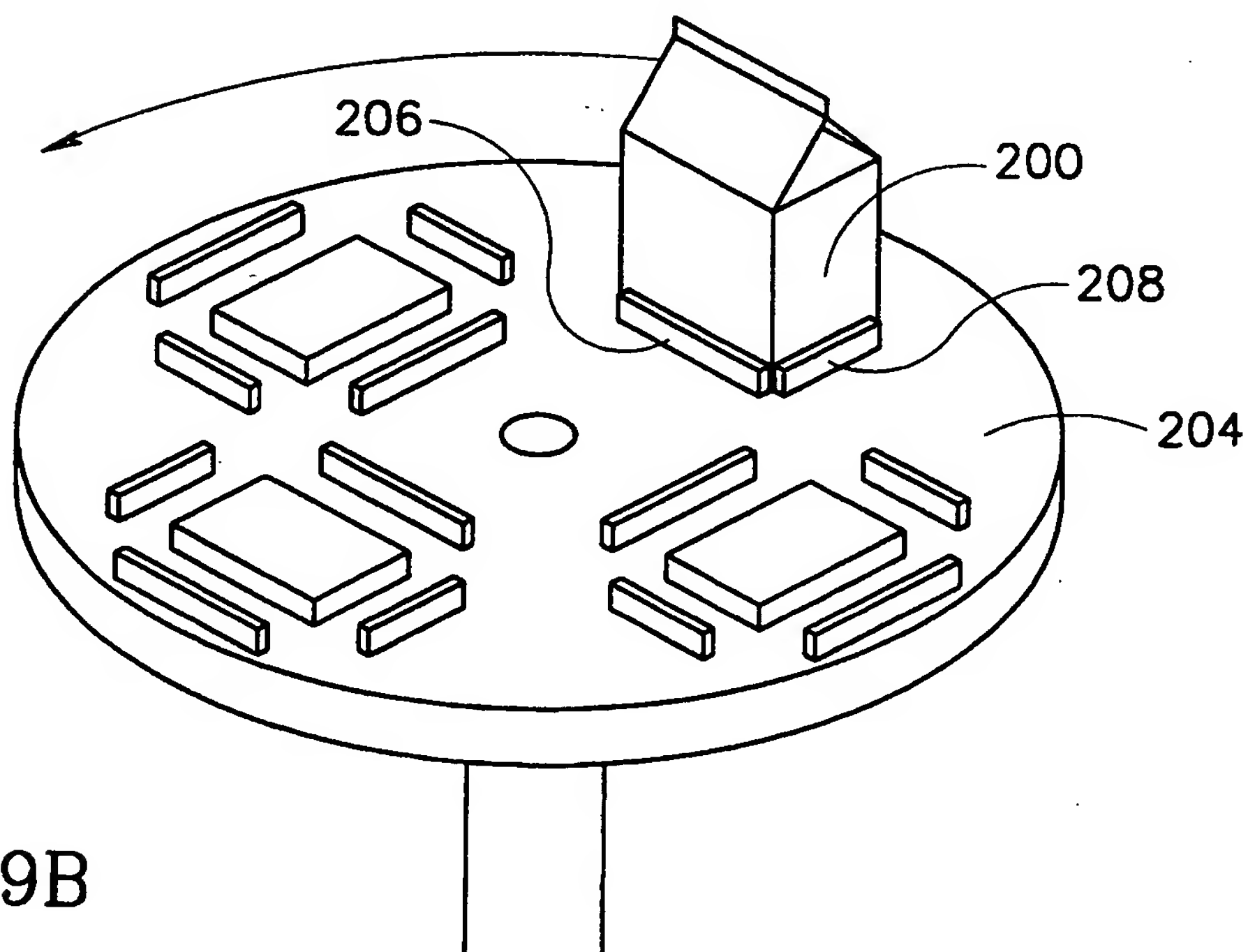


FIG. 9B

INTERNATIONAL SEARCH REPORT

International Application No

PC./IL 99/00422

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D75/00 B65B9/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B65D B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	WO 99 38677 A (STERNER MARION ;BP EUROPACK S P A (IT); TRANI GIORGIO (IT); VISONA) 5 August 1999 (1999-08-05) abstract; figures 1,2 ---	1,6
A	US 3 508 374 A (BERTOGLIO GUIDO) 28 April 1970 (1970-04-28) column 2, line 21 - line 26; figures 1-9 ---	1,6
A	WO 91 18797 A (JOHNSON & SON INC S C) 12 December 1991 (1991-12-12) page 9, line 22 - line 29 claim 5 -----	1,6

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

15 November 1999

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC., IL 99/00422

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